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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/500,181	02/07/2000	Alexander Berestov	3716(CFP1047US)	2223

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FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, NY 10112-2200

EXAMINER

PATEL, SHEFALI D

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 08/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/500,181

Applicant(s)

BERESTOV, ALEXANDER

Examiner

Shefali d Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 13-19 is/are rejected.
- 7) ☒ Claim(s) 10-12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 22 February 2001 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This action is in response to the amendment filed on June 16, 2003.
2. Objections to the specification and claims (claims 10-12) have been withdrawn.
3. Applicant has overcome the drawing objections by amending the specification.
4. 35 U.S.C. 112 2nd paragraph rejections to claims 10-12 have been withdrawn.

Response to Arguments

1. Applicant's arguments filed on June 16, 2003 have been fully considered but they are not persuasive. Applicant argue starting on page 14 of the remarks, that the applied art of Gerstenberger (USPN 5,220,441), alone or in combination is not seem to disclose or to suggest the features of claims 1, 8, 18 and 19, and in particular, is not seem to disclose or to suggest at least the feature of running a second correspondence search on a first matching point to find a second matching point in a right subimage, wherein the correspondence search is not run on any points to the left of the first matching point. Applicant further argue on page 15 of the remarks, that Gerstenberger does not run a second correspondence search on a first matching point to find a second matching point in the right subimage, wherein the correspondence search is not run on any points to the left of the first matching point. While the Examiner admits this feature, i.e., performing a correspondence search that is not run on any points to the left of the first matching point, is not mentioned by Gerstenberger.

Gerstenberger discloses a method of running a second correspondence search on the first matching point (point 25 in image 21, Fig. 5) to find a second matching point in the right image (point 26 in image 22, Fig. 5). Gerstenberger's invention searches the second corresponding

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search to the left of first matching point (See, col. 10 lines 26-30). Applicant is claiming for the second corresponding search to not run on any points to the left of the first matching point. The choice of direction is common and therefore, it would have been obvious to a person of ordinary skill in the art to not search any points to the left of the first point in the right image to find the edge of the overlapped region of two stereo images. Knowing the left boundary of the right image in the overlap region, one is motivated to search to the right of the first point to find the boundary (i.e., edge) of the left image. This way, overlapped region is obtained, and thus Gerstenberger meets the claimed invention.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerstenberger (USPN 5,220,441).

With regard to **claim 1**, Gerstenberger discloses a method for locating matching points in two images of a scene, a left image (image 22, Fig. 4) and a right image (image 21, Fig. 4) such that the images have at least some overlap area (note that Gerstenberger determines parallax between two images, hence these two images do overlap). Gerstenberger discloses a method that selects a first point within the overlap area in the right image (point 25 in image 21, Fig. 4).

Also, running a first correspondence search using the first point to find a first matching point in

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the left image (point 26 in image 22, Fig. 4). Further, Gerstenberger discloses a method running a second correspondence search on the first matching point (point 25 in image 21, Fig. 4) to find a second matching point in the right image. Gerstenberger's invention searches the second corresponding search to the left of first matching point. Applicant is claiming for the second corresponding search to the right of the first matching point. The choice of direction is common and hence it would have been obvious to a person of ordinary skill in the art to not search any points to the left of the first point in the right image to find the edge of the overlapped region of two stereo images. Knowing the left boundary of the right image in the overlap region, one is motivated to search to the right of the first point to find the boundary (edge) of the left image. This way, overlapped region is obtained.

Gerstenberger discloses a method selecting a match point comprising the first matching point and second matching point at column 10 lines 43-50. Note that the match point is selected after evaluating the search window (SW) and corresponding window (CW).

Claim 18 recites identical features as claim 1 except claim 18 is a system claim. Thus, arguments similar to that presented above for claim 1 is equally applicable to claim 18. Additionally, **Claim 18** includes an additional element of storage device in its system, which is disclosed in Gerstenberger's invention at column 6 lines 11-15 and also shown at element 100 in Figure 2.

With regard to **claim 2** Gerstenberger discloses a method where the step of selecting a match point comprising selecting only those match points in which the second matching point is same as the first matching point at column 7 lines 52-60.

With regard to **claim 3**, Gerstenberger discloses a method where the step of running the first correspondence search comprises running a classic stereo correspondence search at column 6 lines 11-17.

With regard to **claim 4**, Gerstenberger discloses a method where the second correspondence search uses a different matching algorithm than the algorithm used in the first correspondence search at column 9 lines 44-53. Second correspondence search is run by identifying location of the tie points, where the first correspondence search is determined using the boundary windows.

With regard to **claim 5**, Gerstenberger discloses a method where the step of running the first correspondence search comprises running a correlation-based matching algorithm at column 8 lines 35-41. Note that the correlation-based matching algorithm is used throughout the Gerstenberger's invention.

3. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerstenberger, as applied to claim 1 above, in view of Onda (USPN 5,867,591).

With regard to **claims 6** Gerstenberger does not expressly disclose the step of running a first correspondence search comprising a feature-based matching algorithm. Onda discloses a method where the step of running the first correspondence search comprises running a feature-based matching algorithm (See, column 12 lines 25-30). One of ordinary skill in the art would have been motivated to use the feature-based matching algorithm of Onda in order to evaluate the corresponding points of the edges that comes in contact when two images are overlapped.

With regard to **claim 7**, Onda discloses a method where the step of running the first correspondence search comprises running a phase-based matching algorithm (See, column 10 lines 13-28), respectively.

4. Claims 8, 13-17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerstenberger in view of Onda as applied to claims 1-7 above, and further in view of Chen et al. (USPN 5,917,962).

With regard to **claim 8**, Gerstenberger (as modified by Onda) discloses all of the claimed subject matter as already discussed above in paragraphs 2-3 and the arguments are not repeated herein, but are incorporated by reference. Claim 8 distinguishes from claim 1 only in that it recites splitting the left and the right image into left and right subimages wherein each subimage comprises the values of only one of the color coordinates used to define the image with which it is associated; pairing each left and right subimages, which uses the same color coordinate values. However, Chen et al. discloses method of partitioning an image where the subimages comprises the values of only one of the color coordinates used to define the image with which its associated (Figure 4 and it's respective section in specification). Chen et al. teaches the concept of subimages evaluating on a pixel-by-pixel (column 1 lines 13-25) and it is also well known in the art. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to split the image into subimages and evaluate each subimages depending on the color coordinate value and to pair each subimages that uses the same color coordinate values. By doing this, one can decrease the memory requirement associated with color data to provide more efficient transmission and storage of the image.

Note: Gerstenberger discloses storing each selected match point in a list of match points (column 15 lines 19-20). And, Onda discloses a method in matching stereo images where the two images, left and right, are split in left and right subimages (column 11 lines 9-14).

With regard to **claims 13-15**, the recited features are the same as those in claims 3-5, and the arguments in paragraph 8 above as to the relevance of Gerstenberger are incorporated herein.

With regard to **claims 16-17**, the recited features are the same as those in claims 6-7, and the arguments in paragraph 9 above as to the relevance of Gerstenberger and Onda are incorporated herein.

With regard to **claim 19**, both Gerstenberger and Chen et al. discloses a computer-readable medium in Figure 2 and Figure 1, respectively. The recited features are the same as those in claim 8, and the arguments in paragraph 10 above as to the relevance of Gerstenberger, Onda, and Chen et al. are incorporated herein.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerstenberger in view of Onda in view of Chen et al. as applied to claim 8 above, and further in view of Prazdny (USPN 4,745,562).

Regarding **claim 9**, Prazdny discloses a method of comparing the matching points stored in the list of match points that correspond to the given point across each subimage pair (column 8 lines 36-41) and responsive to the matching points in the list of matching points being different for each subimage pair (column 9 lines 3-17), removing the matching point from the list of match points (column 10 lines 28-39, note that finding the best “allowable matches within a window” the matching point is determined).

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At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the invention of Prazdny (finding, comparing and removing the matching points from the list (or table)) with the inventions of Gerstenberger, Onda and Chen et al. One can expedite the process by using the list of stored matching points to compare each pixel of subimages.

Allowable Subject Matter

6. Claims 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The closest prior art to Gerstenberger directed to a method for determining parallax between first and second images of a scene employing an iterative image pattern search and correlation process by running a correspondence search on points. However, Gerstenberger says nothing about retrieving a distance value which represents the distance between the camera location used to capture the right image and the camera location used to capture the left image; and creating a disparity map of the scene captured by the images by determining a disparity value for each point in the image, wherein values in the disparity map are calculated by sing the distance between the match points that correspond to the point in the disparity distance map in the list of match points in conjunction with the retrieved value. It is for this reason in combination with all the other elements of the claim that claim 10 would be allowable if rewritten in independent form including al of the limitation of the base claim and any intervening claims.

Claims 11-12 depends from claim 10 and therefore claims 11-12 would be allowable for the same reasons.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

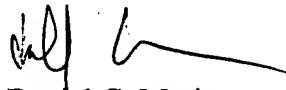
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shefali d Patel whose telephone number is 703-306-4182. The examiner can normally be reached on M-F 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H Boudreau can be reached on 703-305-4706. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

Shefali Patel
August 5, 2003



Daniel G. Mariam
Primary Examiner
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